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Name _____ Date _____

Reteaching: For use after Lesson 8.1, Algebra 2 with Trigonometry

Roots and Radicals

■ **Concept:** Simplifying an nth root

Remember: The principal nth root of k is denoted by the symbol $\sqrt[n]{k}$ where k is the radicand, n is the index (not usually written if $n = 2$), and $\sqrt{\ }$ is the radical sign.

$\sqrt[n]{k} = r$ means $\underbrace{r \cdot r \cdot \ldots \cdot r}_{n \text{ times}} = k$

Example: Simplify: $\sqrt[3]{0.064a^3b^6}$

$\sqrt[3]{0.064} \cdot \sqrt[3]{a^3} \cdot \sqrt[3]{b^6}$

$0.4 \cdot a \cdot b^2$

Consider each part separately.
$(0.4) \cdot (0.4) \cdot (0.4) = 0.064$
$b^2 \cdot b^2 \cdot b^2 = b^6$

So, $\sqrt[3]{0.064a^3b^6} = 0.4ab^2$.

Simplify each radical expression if it is a real number.

1. $\sqrt{0.09}$ _____
2. $\sqrt{-625}$ _____
3. $\sqrt[3]{-1000}$ _____
4. $\sqrt{0.01x^6}$ _____
5. $\sqrt[3]{8x^9}$ _____
6. $\sqrt{100x^8}$ _____

■ **Concept:** Solving equations of the form $x^n = k$

Remember: If $k < 0$ and n is odd, then $\sqrt[n]{k}$ is a negative real number.

Example: Find the real solutions, if any, for $x^4 = \frac{16}{81}$.

$$x^4 = \frac{16}{81}$$

$$x = \frac{2}{3}, \frac{-2}{3}$$

Check: $\left(\frac{2}{3}\right)^4 = \frac{2^4}{3^4} = \frac{16}{81}$ $\left(\frac{-2}{3}\right)^4 = \frac{(-2)^4}{3^4} = \frac{16}{81}$

Find the real solutions, if any, for each equation.

7. $x^2 = 9$ _____
8. $5x^2 = 125$ _____
9. $x^5 = 32$ _____
10. $-3x^2 = -147$ _____
11. $2x^2 = -50$ _____
12. $2x^3 = -250$ _____